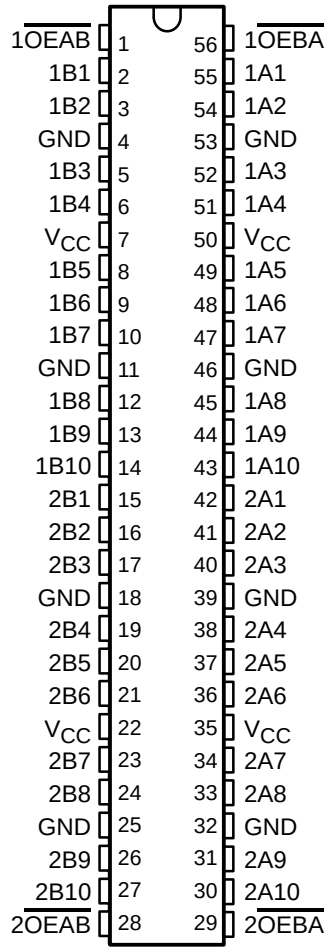
- **Members of the Texas Instruments *Widebus*™ Family**
- **State-of-the-Art *EPIC*-II*B*™ BiCMOS Design Significantly Reduces Power Dissipation**
- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**
- **Typical $V_{OLP}$ (Output Ground Bounce) < 1 V at $V_{CC}$ = 5 V, $T_A$ = 25°C**
- **Distributed $V_{CC}$ and GND Pin Configuration Minimizes High-Speed Switching Noise**
- **Flow-Through Architecture Optimizes PCB Layout**
- **High-Drive Outputs (–32-mA $I_{OH}$, 64-mA $I_{OL}$)**
- **Packaged in Plastic 300-mil Shrink Small-Outline Packages (DL) and 380-mil Fine-Pitch Ceramic Flat Packages (WD) Using 25-mil Center-to-Center Spacings**

**SN54ABT16862 . . . WD PACKAGE**
**SN74ABT16862 . . . DL PACKAGE**
**(TOP VIEW)**




## description

The ’ABT18862 is a 20-bit transceiver designed for asynchronous communication between data buses. The control function implementation allows for maximum flexibility in timing.

The ’ABT16862 can be used as two 10-bit transceivers or one 20-bit transceiver. It allows data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the output-enable ($\overline{OEAB}$ and $\overline{OEBA}$) inputs.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to $V_{CC}$ through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The SN74ABT16862 is packaged in TI’s shrink small-outline package (DL), which provides twice the I/O pin count and functionality of standard small-outline packages in the same printed-circuit-board area.

The SN54ABT16862 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ABT16862 is characterized for operation from –40°C to 85°C.

**FUNCTION TABLE**
**(each 10-bit section)**

| INPUTS | | OPERATION |
|---|---|---|
| $\overline{OEAB}$ | $\overline{OEBA}$ | |
| L | H | A data to B bus |
| H | L | B data to A bus |
| H | H | Isolation |
| L | L | Latch A and B (A = B) |

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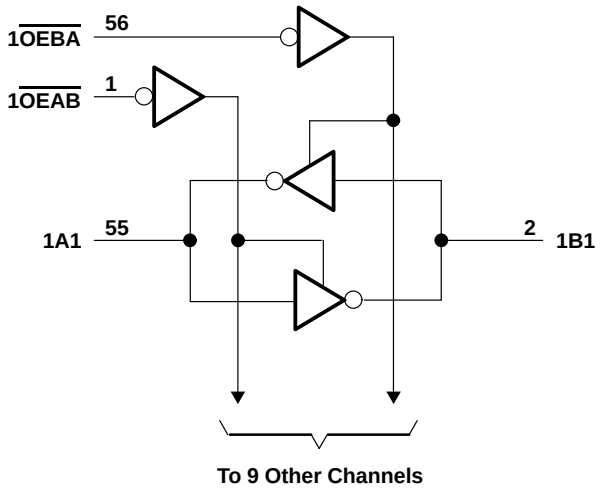
## logic diagram (positive logic)




## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, $V_{CC}$ . . . . . –0.5 V to 7 V
Input voltage range, $V_I$ (except I/O ports) (see Note 1) . . . . . –0.5 V to 7 V
Voltage range applied to any output in the high state or power-off state, $V_O$ . . . . . –0.5 V to 5.5 V
Current into any output in the low state, $I_O$: SN54ABT16862 . . . . . 96 mA
SN74ABT16862 . . . . . 128 mA
Input clamp current, $I_{IK}$ ($V_I$ < 0) . . . . . –18 mA
Output clamp current, $I_{OK}$ ($V_O$ < 0) . . . . . –50 mA
Maximum power dissipation at $T_A$ = 55°C (in still air) . . . . . 1 W
Storage temperature range . . . . . –65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

## recommended operating conditions (see Note 2)

| | | | SN54ABT16862 | | SN74ABT16862 | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | MIN | MAX | MIN | MAX | |
| $V_{CC}$ | Supply voltage | | 4.5 | 5.5 | 4.5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | | 2 | | 2 | | V |
| $V_{IL}$ | Low-level input voltage | | | 0.8 | | 0.8 | V |
| $V_I$ | Input voltage | | 0 | $V_{CC}$ | 0 | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | | | –24 | | –32 | mA |
| $I_{OL}$ | Low-level output current | | | 48 | | 64 | mA |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | Outputs enabled | | 10 | | 10 | ns/V |
| $T_A$ | Operating free-air temperature | | –55 | 125 | –40 | 85 | °C |

NOTE 2: Unused or floating inputs must be held high or low.

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | | | $T_A$ = 25°C | | | SN54ABT16862 | | SN74ABT16862 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP† | MAX | MIN | MAX | MIN | MAX | |
| $V_{IK}$ | $V_{CC}$ = 4.5 V, | $I_I$ = –18 mA | | | | –1.2 | | –1.2 | | –1.2 | V |
| $V_{OH}$ | $V_{CC}$ = 4.5 V, | $I_{OH}$ = – 3 mA | | 2.5 | | | 2.5 | | 2.5 | | V |
| | $V_{CC}$ = 5 V, | $I_{OH}$ = – 3 mA | | 3 | | | 3 | | 3 | | |
| | $V_{CC}$ = 4.5 V, | $I_{OH}$ = – 24 mA | | 2 | | | 2 | | | | |
| | $V_{CC}$ = 4.5 V, | $I_{OH}$ = – 32 mA | | 2‡ | | | | | 2 | | |
| $V_{OL}$ | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 48 mA | | | | 0.55 | | 0.55 | | | V |
| | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 64 mA | | | | 0.55‡ | | | | 0.55 | |
| $I_I$ | $V_{CC}$ = 5.5 V, $V_I$ = $V_{CC}$ or GND | | Control inputs | | | ±1 | | ±1 | | ±1 | µA |
| | | | A or B ports | | | ±100 | | ±100 | | ±100 | |
| $I_{OZH}$§ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.7 V | | | | 50 | | 50 | | 50 | µA |
| $I_{OZL}$§ | $V_{CC}$ = 5.5 V, | $V_O$ = 0.5 V | | | | –50 | | –50 | | –50 | µA |
| $I_{OFF}$ | $V_{CC}$ = 0 V, | $V_I$ or $V_O \le$ 4.5 V | | | | ±100 | | | | ±100 | µA |
| $I_{CEX}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 5.5 V | Outputs high | | | 50 | | 50 | | 50 | µA |
| $I_O$¶ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.5 V | | –50 | –100 | –180 | –50 | –180 | –50 | –180 | mA |
| $I_{CC}$ | $V_{CC}$ = 5.5 V, $I_O$ = 0, $V_I$ = $V_{CC}$ or GND | A or B ports | Outputs high | | | 2 | | 2 | | 2 | mA |
| | | | Outputs low | | | 32 | | 32 | | 32 | |
| | | | Outputs disabled | | | 2 | | 2 | | 2 | |
| $\Delta I_{CC}$# | $V_{CC}$ = 5.5 V, One input at 3.4 V, Other inputs at $V_{CC}$ or GND | Data inputs | Outputs enabled | | | 1 | | 1.5 | | 1 | mA |
| | | | Outputs disabled | | | 0.05 | | 0.05 | | 0.05 | |
| | | Control inputs | | | | 1.5 | | 1.5 | | 1.5 | |
| $C_i$ | $V_I$ = 2.5 V or 0.5 V | | Control inputs | | | | | | | | pF |
| $C_{io}$ | $V_O$ = 2.5 V or 0.5 V | | A or B ports | | | | | | | | pF |

† All typical values are at $V_{CC}$ = 5 V.
‡ On products compliant to MIL-STD-883, Class B, this parameter does not apply.
§ The parameters $I_{OZH}$ and $I_{OZL}$ include the input leakage current.
¶ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
# This is the increase in supply current for each input that is at the specified TTL voltage level rather than $V_{CC}$ or GND.

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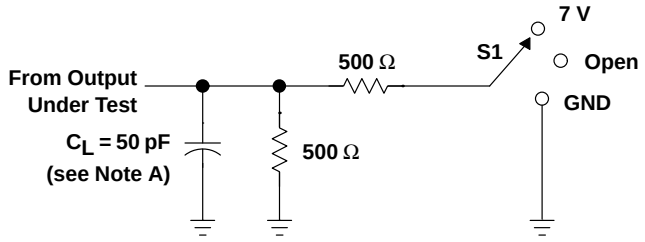
**switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L$ = 50 pF (unless otherwise noted) (see Figure 1)**

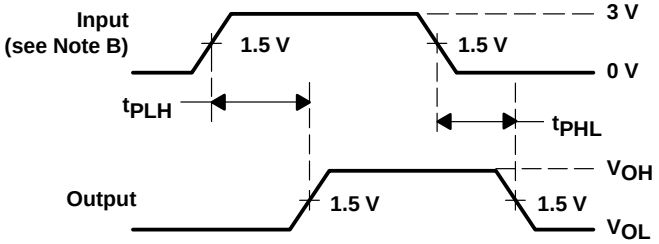
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 5 V, $T_A$ = 25°C | | | SN54ABT16862 | | SN74ABT16862 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | B or A | | | | | | | | ns |
| $t_{PHL}$ | | | | | | | | | | |
| $t_{PZH}$ | OEAB or OEBA | B or A | | | | | | | | ns |
| $t_{PZL}$ | | | | | | | | | | |
| $t_{PHZ}$ | OEAB or OEBA | B or A | | | | | | | | ns |
| $t_{PLZ}$ | | | | | | | | | | |

## PARAMETER MEASUREMENT INFORMATION

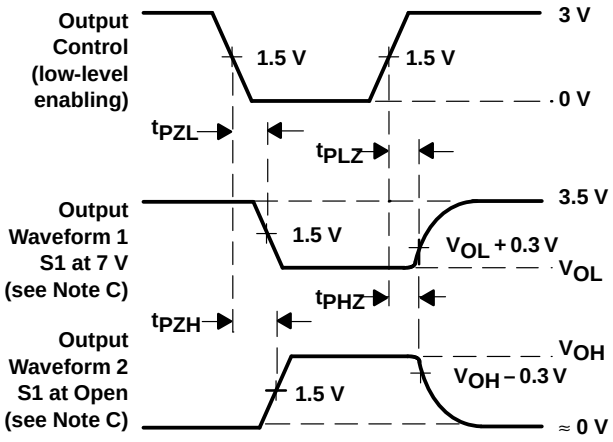



LOAD CIRCUIT FOR OUTPUTS

| TEST | S1 |
|---|---|
| $t_{PLH}/t_{PHL}$ | Open |
| $t_{PLZ}/t_{PZL}$ | 7 V |
| $t_{PHZ}/t_{PZH}$ | Open |




VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES




VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

NOTES: A. $C_L$ includes probe and jig capacitance.
B. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, $Z_O$ = 50 Ω, $t_r$ ≤ 2.5 ns, $t_f$ ≤ 2.5 ns.
C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
D. The outputs are measured one at a time with one transition per measurement.

**Figure 1. Load Circuit and Voltage Waveforms**

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